

# Scientific and Philosophical Challenges to Theism <sup>\*</sup>

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## Abstract

Modern science developed within a culture of Judeo-Christian theism, and science and theism have generally supported each other. However, there are certainly areas in both science and religion that puzzle me. Here I outline some puzzles that have arisen for me concerning everlasting life, human free will, divine free will, the simplicity and probability of God, the problem of evil, and the converse problem of elegance.

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# 1 Introduction

Modern science developed within a culture of Judeo-Christian theism for several reasons [1]. For example, the idea of a lawgiver for nature (i.e., God) encouraged belief in laws of nature. Also, the need to study the laws of nature was encouraged by the Biblical command in the first book of the Bible, Genesis 1:28: “Be fruitful and multiply; fill the earth and subdue it; have dominion over the fish of the sea, over the birds of the air, and over every living thing that moves on the earth” [2].

But once the idea of laws of nature was derived from the idea of a lawgiver, one could often forget the lawgiver and just study the laws, rather as citizens in a nation can obey its laws without thinking about who made those laws. There is then a tendency to conclude that there is no lawgiver at all.

Since both science and religion are human activities, and since humans often have conflicts, it is not surprising that there are science-religion conflicts. Since science and religion tend to claim jurisdiction over territories that have historically overlapped, it is no wonder that conflict should on occasion have arisen between them, as the aftermath of the Galileo affair would illustrate [3].

At other times there are genuine human uncertainties and differences of opinion. For example, theists have differed over whether the evidence for biological evolution is convincing, though now it seems that most theologians accept it. Somewhat similarly, today there is disagreement within both theists and scientists about whether the multiverse ideas are correct [4].

Generally I see science and religion as supporting each other, but there are certainly areas in both that puzzle me. Let me discuss some that to me have seemed to be the biggest challenges to theism, and give some thoughts I have had on them. These thoughts are certainly tentative, so I would certainly appreciate any help others can provide on these mysteries.

# 2 The Afterlife Awareness Problem

One rather arcane challenge that has occurred to me is the application of the Carter-Leslie-Nielsen-Gott doomsday argument [5, 6, 7, 8, 9, 10] to the afterlife. The original doomsday argument is that the observation that we are among the first

hundred billion or so humans reduces the prior probability that we find ourselves in a species whose total lifetime number of individuals is much higher. If humans were to continue at present or growing populations for more than a few hundred additional years, it would be unlikely for us to have found ourselves in the very small fraction alive by now. On the other hand, if the human race were to end sooner, we would not be so unusual.

The doomsday argument implies that unless the *a priori* probability is very high for far more humans in the future than in the past, then our observations of how many humans there have been in the past makes the *a posteriori* probability low for far more humans in the future. Although this argument has been widely debated and disputed (too widely for me to give a comprehensive list of references), it has never been refuted, and I believe that it is basically valid.

I realized several years ago that similar consequences would seem to apply to hypotheses about an afterlife, experiences after physical death. If one were not absolutely certain of an afterlife that would last enormously longer than the pre-death life, then the observation that we are experiencing (presumably) pre-death life rather than the afterlife would significantly reduce the *a posteriori* epistemic probability for a very long afterlife. Otherwise, our present experiences would seem to be highly unusual if there were in fact far more afterlife experiences than pre-death experiences.

After puzzling over this for several years (and having long series of email discussions with a small number of people, most particularly Richard Swinburne, who were kind enough to consider my thoughts on it without necessarily agreeing with the presuppositions), I stumbled upon an analogous possibility in physics, the formation of brains by vacuum fluctuations, which gives a similar problem if the universe lasts too long [11, 12, 13]. These brains are rather similar to those which had been earlier proposed to arise from thermal fluctuations and which had been named Boltzmann brains [14], following a somewhat analogous suggestion by Boltzmann [15] that he actually attributed to his assistant Dr. Schuetz (leading Andreas Albrecht, the originator of the phrase Boltzmann Brain, to quip that they might actually be better named Schuetz's Schmartz). Therefore, I generally followed the usage of this catchy name for my related idea of brains as vacuum fluctuations, though so far as I know

I was the first to raise the problem with vacuum fluctuations themselves.

The problem with these generalized Boltzmann brains is that if the universe lasts too long (e.g., infinitely long), then per comoving volume (i.e., in a region that expands with the universe and would contain a fixed number of atoms if they are not created or destroyed), there would only be a fixed number of ordinary observers (conscious beings like us who presumably evolved by natural selection), since they can surely last only a finite time, say when there are still stars burning, but on the other hand there would be a much larger (e.g., infinite) number of Boltzmann brains. Then almost all observations per comoving volume would be made by Boltzmann brains. So if this scenario were correct, we would most likely be Boltzmann brains.

But Boltzmann brains are very unlikely to observe the order that we actually see, so our ordered observations (with rather coherent detailed memories, etc.) are strong evidence against our being Boltzmann brains and therefore also against there being far more Boltzmann brains than ordinary observers. In this way we have observational evidence against a universe that lasts too long, at least under the assumption that Boltzmann brains can form from vacuum fluctuations at similar rates at any time arbitrarily far into the future, and under the assumption that we count the ratio of Boltzmann brains to ordinary observers in a fixed comoving volume before our universe possibly tunnels into something different.

There are many conceivable solutions to the Boltzmann brain problem [16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41], some of which abandon the assumptions of the previous paragraph, though none that is universally accepted. For the analogous problem with the afterlife, which I might call the afterlife awareness (AA) problem instead of the Boltzmann brain (BB) problem, what seems to me possibly most relevant is the solution I suggested [11, 12, 13] that instead of persisting indefinitely into the future, our universe could be decaying quantum mechanically at a rate comparable to its exponential expansion rate, decaying at least fast enough to make the expectation value of the four-volume of the comoving region (the three-volume multiplied by the persistence probability and integrated over the time) finite and not so large that Boltzmann brains would dominate over ordinary observers (OOs). This proposed solution has its own problem of the fine tuning of the decay rate (which is not one

of the fine tunings that might be explained by the observational selection of the anthropic principle), since the decay rate has to be great enough and yet not so great to make it highly improbable that the universe has lasted as long as it already has.

However, whether or not my suggested solution to the Boltzmann brain problem in our physical universe is correct, it occurred to me that something similar might conceivably be a solution to the analogous afterlife awareness problem. But before explaining this, I need to reformulate the problem in terms of the measures of conscious experiences.

All of the problems discussed here, the doomsday (DD) argument, the Boltzmann brain (BB) problem, and the afterlife awareness (AA) problem, arise from comparing the probability of an experience to be one of those (which does not fit our observations) to that of being an ordinary observer (OO) (which apparently would fit our observations). (I am tempted to think of other related problems, such as that of CCs or conscious clouds [42], but I haven't yet thought of analogous problems for all of the letters of the alphabet after D to O, though it did occur to me that EEs could be eternal experiences, conscious experiences that are each eternal, unlike our experiences that are each momentary.)

One might well postulate that each conscious perception or experience (all that one is momentarily conscious aware of) has a *measure* associated with it, giving the probability of that experience's being selected at random if a random selection were made [43, 44, 45, 46]. (One does not need to suppose that there actually *is* any such random selection in order to be able to calculate likelihoods *as if* such a selection occurred.) Then any set of conscious perception would have a corresponding measure obtained by summing the measures for the individual perceptions. (It could be the case that conscious perceptions form a continuum rather than a discrete set, in which case one would only have positive measures for continuous sets of perceptions, rather than for individual perceptions, analogous to the way that there is positive volume only for continuous sets of spatial points and not for the individual points. But for simplicity here I shall consider just the alternative logical possibility that the perceptions are discrete rather than continuous.)

In a classical physics picture of a single conscious being having a unique temporal

sequence of perceptions, one might make an approximation that the measure for a particular sequential set of perceptions is proportional to the time taken to have that set. So if during 16 waking hours (960 minutes) in a day one is conscious of eating for 96 minutes, say, one might take the measure for experiences of eating during that day to be 0.1 or one-tenth of the measure for all the conscious experiences of the waking hours. (I don't mean to be denying that one is having conscious perceptions while asleep during dreams, but I am avoiding the question of how to compare their measure with perceptions while awake.)

In a quantum physics picture, there are also what are usually interpreted as the quantum probabilities of various alternative possibilities. So, for example, if there is a quantum probability of 0.2 that one is fasting during those 16 waking hours and 0.8 that one spends 96 minutes eating, then the relative measure of the experiences of eating would be only 0.8 times 0.1, or 0.08. Or, if one would be eating caviar for 96 minutes in a day if one won a lottery for which the quantum probability of winning is one in a million (and if one would not be eating caviar at all otherwise), the relative measure of the experience of eating caviar, out of all the experiences in that day with all results of the lottery, would be  $10^{-7}$ .

I have formulated a framework for connecting consciousness to physics [43, 44, 46] in which each conscious perception has a measure given by the expectation value of a corresponding quantum operator. However, for the present discussion, it is not important whether or not this framework is correct, but just that conscious perceptions do have objective measures that give frequency-type probabilities of the perceptions' being selected if they were selected at random. (Since I believe that the random selection is purely hypothetical, these probabilities, while being perfectly objective for each possible theory giving them, are also hypothetical, what I might call objective hypothetical probabilities, to be distinguished from the subjective epistemic probabilities that one might assign to various theories that are not known to be correct or incorrect.)

Now suppose that one has various theories  $T_i$  that each tell what fraction  $f_i$  of the measure of all conscious perceptions or experiences are pre-death rather than afterlife. (For simplicity I shall just focus on these two possible types and also assume that the content of each experience clearly identifies which type it is, leaving

out such experiences as those here in the present life in which one might feel that one has gone to heaven or hell.) Then in each  $T_i$ , the probability that a randomly selected conscious experience would be a pre-death experience would be  $f_i$ . Given the information that one is observing a pre-death experience (and no other information), this  $f_i$  would then be the likelihood of the theory  $T_i$ . (If one includes other information from the particular conscious perception being experienced, that would further restrict the fraction and give a lower likelihood.)

For a theory  $T_i$  predicting no afterlife, all experiences would be pre-death, so  $f_i = 1$ . For a theory predicting an afterlife with far greater measure of experiences,  $f_i \ll 1$ . In the limit of an infinite measure of experience for afterlife awarenesses but still only a finite measure for pre-death experiences,  $f_i = 0$ .

Now suppose that various theories of these different types are all assigned nonzero *a priori* probabilities, so that one is originally not epistemically certain of any of them (though one might have strong preferences). Then by Bayes' theorem, the final epistemic *a posteriori* probabilities to be assigned to the theories would be proportional to their *a priori* probabilities multiplied by their likelihoods  $f_i$ . This then has the effect of reducing the *a posteriori* probabilities more for the theories in which the fraction of the measure of pre-death experiences is smaller. For a theory in which  $f_i$  is very tiny (a very large relative measure of afterlife awarenesses), the *a posteriori* probability would be less than 1/2 unless the total *a priori* probability of all the theories with higher  $f_i$  is smaller than  $f_i$ . In particular, if the total *a priori* epistemic probability of all the theories with  $f_i = 1$  (theories with no afterlife; all experiences pre-death experiences) is positive, larger than zero, then in the limit that any theory gives  $f_i = 0$  (i.e., by having an infinite measure of afterlife awarenesses and only a finite measure of pre-death experiences), it would have zero *a posteriori* epistemic probability.

Thus it seems that unless one started absolutely certain of an infinite afterlife, after considering the evidence that one is having a pre-death experience instead, one should then assign zero epistemic probability to the idea of an infinite afterlife.

Given that I had previously had faith in an infinite afterlife, though not quite 100% faith, this conclusion certainly seemed contrary to how I had interpreted the afterlife. It has bothered me ever since I first thought of it.

One possible solution, suggested to me by the originator of the doomsday argument, Brandon Carter [47], is that the afterlife is not an infinite set of afterlife awarenesses (AAs) but a single eternal experience (EE), or a single one for each person. This finite number of eternal experiences could then have a large but finite measure, leaving  $f_i$  and the resulting *a posteriori* probability nonzero (assuming one was not absolutely certain that this theory is wrong and so assign it zero *a priori* probability). Perhaps this would be a more sophisticated way of looking at eternal life, not as an infinite set of experiences but as one single eternal experience, or as one single eternal experience for each person.

Another suggested solution was given me by the person who has expounded the doomsday argument the most thoroughly, John Leslie [48], following arguments by Andrei Linde that Leslie previously disputed [10]. Linde’s argument applied to an infinite afterlife would be that although any pre-death experience would be infinitely early if there is an infinite afterlife, it would not be *especially* early, since all experiences at finite time, even in the afterlife, would also be infinitely early. Maybe Leslie’s change of mind in now accepting this argument is correct, but to me the pre-death experiences would still seem to have zero probability in comparison with an infinite measure of afterlife awarenesses, so it does not solve the problem in my own mind.

Another point made by Leslie [48] is that it is just subjective epistemic probabilities that are being discussed, not true objective probabilities that are “out there” in reality. That is, it presumably is the case that either an afterlife of infinite measure definitely exists or definitely does not exist, so the objective probability is either 1 or 0. As Leslie notes, “God’s infinitely powerful and benevolent!” Therefore, one might remain confident that the probability of an infinite afterlife is really 1, even though applying a Bayesian analysis to an uncertain epistemic *a priori* probability (not quite unity for an infinite afterlife) might give zero *a posteriori* epistemic probability for it. Nevertheless, it does bother me that a line of Bayesian reasoning that apparently works in finite cases seems to give zero *a posteriori* epistemic probability for a theistic doctrine that I formerly was much more certain about.

However, another possible way to solve the afterlife awareness problem and avoid the infinite measure of those experiences that would give  $f_i = 0$  for the presumably



finite measure of pre-death experiences (or at least finite measure of pre-death experiences per person), would be to have the measures of each of the infinitely many AAs not constant but decaying sufficiently rapidly in some ordering of them. That is, if one orders the afterlife in decreasing order of their individual measure, one could have the measure per AA decreasing fast enough that the sum converges to a finite total measure that is not too much greater than the corresponding sum of the measures of all the pre-death experiences.

For example, one might postulate that in some theory  $T$ , there is a countably infinite set of AAs, and the  $n$ th AA has the measure  $A(1-x)x^{-n}$  for some  $x$  between 0 and 1, so that the sum over  $n$  is the finite total measure  $A$  of the AAs. Then if the sum of the measures of the pre-death experiences in this theory is  $B$ , the fraction of the measure that is pre-death is  $f = B/(A + B)$ . This is the likelihood of this theory under the observation of a pre-death experience.

Assume for simplicity that this is the only theory under consideration in which there is an afterlife, and that its *a priori* probability is assigned to be  $p$ . Then all the other (non-afterlife) theories have total *a priori* probability  $1 - p$  and have unit likelihood under the observation of a pre-death experience (since all of their experiences are pre-death). The product of the *a priori* probability and the likelihood for this afterlife theory  $T$  is then  $pf$ , and the sum of the products of the *a priori* probabilities and the (unit) likelihoods for all the non-afterlife theories is  $1 - p$ . Normalizing by the sum of these products, which is  $pf + 1 - p$ , Bayes' theorem gives the *a posteriori* probability of this afterlife theory  $T$  as  $pf/(pf + 1 - p) = pB/(A + B - pA)$ , which is not too small so long as  $pf$  is not too small in comparison with  $1 - p$ , the total *a priori* probability of all the (non-afterlife) theories. In particular, the afterlife theory  $T$  has an *a posteriori* probability greater than  $1/2$  if its *a priori* probability is  $p > 1/(1 + f) = (A + B)/(A + 2B)$ , or if  $A/B < (2p - 1)/(1 - p)$ .

If one is nearly certain *a priori* of this afterlife theory  $T$ , so  $p$  is near unity, then the afterlife can have much more measure  $A$  than the pre-death measure  $B$  and yet still give an *a posteriori* probability greater than  $1/2$ . For example, if one were initially 99% certain of the afterlife,  $p = 0.99$ , then its *a posteriori* probability would be greater than  $1/2$  for all  $A$  up to  $98B$ , a total afterlife measure up to 98 times that of the pre-death measure. However, if one initially had only 60% confidence in the

afterlife, then its *a posteriori* probability would be greater than  $1/2$  only for all  $A$  up to  $B/2$ , a total afterlife measure only up to half that of the pre-death measure.

If such an afterlife theory were true, one could have an infinite number of afterlife experiences and yet their total measure would not necessarily swamp that of the pre-death experiences to such an extent that it would have low *a posteriori* probability in view of our observation of having a pre-death experience. Of course, the total measure would not be infinitely greater than the pre-death experiences, and the probability for finding oneself experiencing an AA far along the sequence of ever-decreasing measure would be very small.

In this proposed possible solution of the AA problem, earthly pre-death experiences would not be an infinitesimal fraction of the total, though they could still be a rather small fraction of the total. Furthermore, the quality of the afterlife experiences could presumably be arbitrarily more intense than those of our present pre-death experiences. Although the New Testament and the Koran stress the superiority of heaven, I do not see that they say it is infinitely more important than life, justice, and righteousness here on this earth. Therefore, it is not obvious that this solution to the AA problem is incorrect, though it is certainly speculative and highly tentative, since to the best of my knowledge both the AA problem and its possible solutions have not been discussed in the traditional theological literature.

### 3 Human Free Will

Another potential problem, or at least controversial issue within theistic beliefs, is the question of human free will, which has often been invoked to explain human responsibility and the existence of evil caused by humans. Is there any room for human free will in a universe with definite laws of nature and a definite quantum state? I.e., if the initial conditions and the dynamical laws of evolution are determined, how could humans act otherwise than what would be predicted by these initial conditions and dynamical laws? (Here I am taking free will in the libertarian or incompatibilist sense of being incompatible with determinism or complete determination ultimately by causes or entities other than the being to whom the free will is ascribed.)

One logically possible answer is that human free will could help choose the laws

and the quantum state of the universe. But since that would involve determining the quantum state of the very early universe, far before humans existed, that would seem rather implausible. If one assumed that causality acts only forward in time, and if time indeed goes forward from the early universe to the existence of humans, this logical possibility would seem to be physically impossible. However, we do not fully understand the nature of causation, so it is not completely obvious that causality backward in time really is physically impossible. Indeed, the ordinary concept of causality in physics says that the state of a closed system is completely determined by the laws of evolution and the state at any time, so from the state at one time, the state at all times, both before and after, would be determined, and therefore there is no obvious restriction just to causality forward in time. Nevertheless, even though I do accept timeless views of the universe in which there is no fundamental asymmetry in time and no time asymmetry in causality, I do personally find it rather implausible that human free will choices can help determine the quantum state of the universe from the very beginning.

However, I find an even stronger argument against human free will to be the realization that if God creates everything logically contingent other than Himself, then free will by any created being seems to me to be logically impossible. That is, I see the concept of free will by created beings to be a logical contradiction to the concept that they are created *ex nihilo* by God (or even just to the concept that one can trace back all causation to God). For if God entirely creates or ultimately causes everything contingent other than Himself, as I believe, He creates or causes all such entities not just as one time but at all times, including all actions of the beings He creates. If God creates or causes everything other than Himself that does not exist necessarily, then it seems to me that nothing other than necessary entities (e.g., logical tautologies) can lie outside the purview of this creation or causation, including any actions or choices by created beings. If God totally creates us or causes our entire existence, that would seem to imply that He creates or causes everything that we do, so that all we are and do would be completely created or caused, and hence determined, by God, with our having no true (libertarian) free will.

Now I will admit that if we had some independent existence and were not entirely created or caused by God, then logically we could have free will. God might adopt

us, or at least our independent free will choices, within a universe that He otherwise creates. (I don't even see a contradiction between this logical possibility and God's always knowing what free will choices we would make, since the only contradiction I see is with His creating or ultimately causing all that we are and do and the claim that what we do is free from His determination.) However, this adoption picture, that our free will choices have some existence independent of God and were adopted by God within His universe, seems to leave God's not creating or causing everything contingent other than Himself and hence seems less simple than the traditional monotheistic view that God creates everything contingent other than Himself.

## 4 Divine Free Will and Information Content

So far I have implicitly assumed that God Himself truly has libertarian free will and can do whatever is not logically inconsistent (though I am arguing that it seems logically inconsistent for Him to create beings with libertarian free will, and, if so, that is truly impossible for Him). Sometimes it is assumed that if the laws of nature are fixed and if the initial conditions or quantum state are also fixed, then even God would not be free to make things otherwise. For example, when the Hartle-Hawking 'no-boundary' proposal for the quantum state of the cosmos [49, 50] was first proposed, I was defending it at a small gathering of quantum cosmologists [51], and the late Bryce DeWitt, often considered the father of quantum cosmology, objected, "You don't want to give God any freedom at all!" But before I could think of an answer, Karel Kuchař responded, "But that's His choice." In other words, even if we correctly deduced the quantum state of the universe, it would have been God's choice to create the universe in that state. I.e., God's determining the universe to be in a particular deterministic state would not contradict His free will in making this determination, though it would seemingly preclude the independent free will of any creatures created by God in this state.

However, there is a strand of traditional monotheistic thought, going back at least to Anselm [52], that God Himself is a necessary being. If that is interpreted to mean that God is an entirely necessary being, then even God has no free will. Furthermore, if the necessity of God includes all of His activity, such as His activity in creating the universe or multiverse, then the created universe or multiverse is also necessary and

not contingent. Assuming that God indeed creates everything otherwise contingent other than Himself (e.g., leaving out the apparent logical possibility of other partially independent beings with independent free will, perhaps themselves contingent rather than necessary, that God might adopt within His creation without directly creating their free will choices), then the entirety of existence, what philosophers call the *world*, would be necessary [53].

However, it is not clear to me that God must be a completely necessary being. Anselm's ontological argument just seems to imply the necessary existence of the greatest necessary being, but if only tautologies such as mathematical theorems have necessary existence, then Anselm's proof would only imply that the greatest tautology necessarily exists, and not what one would traditionally interpret to be God. Therefore, it seems to me that, so far as we know, God and the universe might be at least somewhat contingent, not necessarily the way they actually are.

We might consider these various conceptual possibilities in terms of the information content of God. (I say "conceptual possibilities" to denote concepts that we are not sure are impossible, since if in fact God is a necessary being, then it is necessarily impossible for Him not to exist, and on the other hand, if in fact God is not a necessary being, then it is necessarily impossible for Him to have necessary existence. So one or the other of these "possibilities" presumably must be the case, and the other necessarily impossible rather than really being a "possibility," but it is just that we don't know for certain which is necessary and so may epistemically regard both as "conceptual possibilities." I suppose an atheist might also raise the conceptual possibilities not only that God might contingently not exist but also that God might necessarily not exist. I recall hearing this question being asked, perhaps without realizing the full philosophical content, by Lucy Hawking when she was quite young: "Is God impossible?")

If God were entirely necessary, He would have no information content, since the information content of an entity is the minimum that needs to be specified in order from that information to deduce fully the properties of the entity. On the other hand, if God were contingent but simple, He would have small but nonzero information content. And yet a third conceptual possibility is that God is contingent and irreducibly complex, having a large information content.

## 5 The Complexity and Probability of God

This third conceptual possibility is what Richard Dawkins assumes in his popular book, *The God Delusion* [54]. For much of the book, Dawkins sounds like an Old Testament prophet railing against idolatry, except that he believes the worship of any God or gods is idolatrous. But the philosophical heart of his argument is Chapter 4, where he argues against the existence of God by saying that God would have to be extremely complex. Since his arguments are not very tightly stated, I formulated the heart of Dawkins' argument as a syllogism and then, with the help of an email exchange with several colleagues, especially William Lane Craig, I revised it to the following form:

1. A more complex world is less probable than a simpler world.
2. A world with God is more complex than a world without God.
3. Therefore a world with God is less probable than a world without God.

After circulating this form, I did get the obviously hurried reply from Dawkins: "Your three steps seem to me to be valid. Richard Dawlkins [sic]" (1 February 2007).

Now that I have summarized Dawkins' basic argument in a brief form that he seems to agree with, modulo typos, one can ask whether Dawkins is right. The conclusion of the syllogism seems to follow from the two premises (or at least I have intended this to be the case), so it is a question of whether the premises are correct.

One might question whether complexity is improbable, an unproved assumption. There is also the fact that complexity depends on background knowledge and may be only subjective. For example, David Deutsch [55] has emphasized to me that "complexity cannot possibly have a meaning independent of the laws of physics. ... If God is the author of the laws of physics (or of an overarching system under which many sets of laws of physics are instantiated—it doesn't matter) then it is exclusively God's decision how complex anything is, including himself. There neither the idea that the world is 'more complex' if it includes God, nor the idea that God might be the 'simplest' omnipotent being makes sense."

This argument makes sense to me, but it did have the effect of shaking my fundamentalist physicist faith in the simplicity of the laws of nature. However,

more recently Deutsch has pointed out [56] that these considerations do not mean that the concept of the simplicity of the laws of physics is circular: “I don’t think it’s circular, because the fact that simplicity is determined by the laws of physics does not mean that all possible laws are ‘simple’ in their own terms.” So I suppose one might still ask whether in a universe apparently governed by simple laws of physics, God appears to be simple. However, since as Deutsch notes, God could have made Himself appear to have arbitrary complexity, it is a bit dubious to say that His probability is determined by His complexity.

Nevertheless, since we scientists (and indeed most others) prefer hypotheses that are ultimately simple, we might for the sake of argument grant the first premise I have ascribed to Dawkins and ask whether the second premise is correct. Again Deutsch’s comments should lead us to be cautious in drawing such conclusions. However, even if we take the naïve view that one can define the complexity of God (say with respect to the laws of physics in our universe), then it is still not obvious that God is complex, or that He would add complexity to the world. Perhaps God is indeed simple [57].

If God were necessary, then He would have no complexity at all. Even if God were contingent, He might be simple. For example, perhaps God is the best possible being (assuming sufficient background knowledge that this apparently simple definition uniquely specifies some possible entity, though it is certainly unclear that our background knowledge within this universe is sufficient for this). Even if it is not necessary for such a God to exist, He might be simple (if simplicity can indeed be defined).

Even if one concedes that the philosophical idea of God might be simple, there is the question of whether God is simple in traditional monotheism. At first sight, the God of the Bible and of the Koran seems complex. But analogously, Earth’s biosphere seems complex. However, the full set of biospheres arising by evolution in a huge universe or multiverse with simple laws of physics might be simple. Similarly, the limited aspects we experience of God might be complex, but the entirety of God might be simple.

## 6 The Problem of Evil and Elegance

Perhaps the most severe problem of traditional theism is the problem of evil. If God is the best possible being and created everything, why does evil exist?

If instead of being totally created and determined by God, we were adopted and bring in evil by our own free will choices, this might explain human evil, but one would still have the problem of natural evil: disease, earthquakes, storms, floods, and other evils not caused by humans. So whereas human free will is often invoked to solve the problem of evil, it does not seem to give a full solution, and therefore I do not regard the problem of evil as sufficient for me to give up my simple hypothesis that God created and determined everything contingent other than Himself.

Perhaps because I independently stumbled upon it myself, though many years later, I regard the best tentative solution for the problem of evil to be the multiverse theodicy [58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72] that God created all universes that are better to exist than not to exist. So rather than God's just creating one or more universes that have no evil, one might imagine that God thought it better to create all universes that are better to exist than not to exist. In other words, instead of minimizing evil by avoiding creating any universes with evil, God might be seeking to maximize the net good over evil. Therefore, instead of leaving our universe uncreated because it has evil in it as well as good, God might have seen that it has more good than evil and decided that it would be better to exist than not to exist.

I would think that it is certainly common to make analogous judgments about the existence of persons rather than of universes. For example, I have certainly done evil and hurt other people. Yet I still feel that it is better for me to exist than not to exist. I believe that it is the same for you and hope that you feel similarly, that it is indeed better for you to exist than not to exist. If an entity has good that is accompanied by a lesser amount of evil, then it indeed seems better for that entity to exist, rather than that all evil be eliminated.

For me, particularly as one who has worked with and lived with the wheelchair-bound Stephen Hawking, one of the most horrific scenes in the movie *The Pianist* was when the Nazis entered a Jewish apartment in Warsaw and ordered the people sitting around the table to stand. An elderly man in a wheelchair could not comply, so the



Nazis then heaved him out the third floor window to his death on the street below. In realizing that the inhuman Nazis were not actually nonhuman but exhibited some of the same sinful tendencies that I see in myself, it occurred to me that perhaps in their twisted minds they were trying to eliminate what they saw as evil, disabilities and weaknesses. Without endorsing the Nazis' ideas of what is good and evil, which were also quite distorted, I would indeed be sympathetic to efforts to reduce disabilities and weaknesses in a person, with his or her consent, while also working to enhance the good that the person has. However, the Nazis' procedure of cruelly eliminating entire persons and communities that they saw as having evils or weaknesses (or often just differences from themselves) was barbaric and totally unjustified. Perhaps analogously, we should not expect God to eliminate (or avoid creating) entire universes that have both good and evil in them.

Now although I do believe that the many-universes solution to the problem of evil is the best one I have heard of, I also think that so far it has not completely solved the problem. With this solution, one might expect that if our universe is a typical one with more good than evil, it would not have enormously more good than evil. That is certainly consistent with my general impression as a human of the moral goodness and evil on the earth. However, if one applies the same idea to the elegance of the laws of physics as another good that God might be seeking to promote, one might expect that the laws of physics of our universe would have more elegance than ugliness, but not enormously more. On the other hand, my impression as a scientist is that the laws of physics are enormously more elegant than ugly, so it seems doubtful that God created all universes with just more elegance than ugliness in the natural laws.

In other words, for me the problem of evil (which might be explained by having God create all universes better to exist than not) has been replaced by the problem of elegance (why on the level of the beauty of the laws of nature our universe seems enormously more elegant than ugly). Another expression of the problem is the question of why God seems to have so much higher standards of mathematical elegance (not allowing our universe much mathematical ugliness) than of moral good and evil (apparently permitting a much higher ratio of moral evil to good).

## 7 Conclusions

Challenges to theism go back to one of the oldest books of the Bible, the Book of Job, whose lead character wrestled with the problem of evil that was basically left unexplained to him. As finite beings, like Job we should not expect to understand everything, though it is good to seek as much understanding as possible. We can wrestle with the problems, but in the end we have to live life with the limited knowledge that we do have.

In summary, theism and science generally support each other, though there are occasionally conflicts. Everlasting life has raised a puzzle for me. Human and/or divine free will are also puzzling. Whether God is seen as probable or improbable depends on one's assumptions. The problem of evil may be reformulated as the problem of elegance.

Let me close with an aphorism that I coined to summarize my thoughts as a scientist and as a Christian:

*Science reveals the intelligence of the universe;  
the Bible reveals the Intelligence behind the universe.*

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